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TECHNICAL BRIEF

Vendor Managed Inventory: Is It Right for Your Supply Chain?

The private sector sometimes uses a vendor managed inventory (VMI) model to manage customer stock more efficiently. This brief illustrates how the public sector can benefit from a VMI approach.

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Credit: Jean Jacques Augustin for SCMS

What Is VMI?

As governments and implementation partners help support health delivery and health systems in developing countries, they are beginning to appreciate the importance of supply chain management and supply chain capability. However, before they attempt to build a supply chain, planners must know what supply system designs and frameworks are available. One supply chain model that may hold promise for developing country health supply chains is vendor managed inventory (VMI).

With VMI, a method of inventory control, the supplier (vendor) monitors and maintains the quantity of commodities at the customers' location (the customer is the custodian of the inventory). VMI is the opposite of the inventory management approach used by many organizations today. Currently, in many developing country supply chains, when commodities are needed, the custodian calculates the needed quantities and places an order with their supplier (who is their vendor). Traditionally, the custodian controls the timing and the size of the order being placed. With VMI, the vendor, at the custodian's location, manages the timing and amount of stock to be replenished.

What Benefits Does VMI Offer?

In a private-sector VMI system, the vendor or supplier has the primary responsibility for managing the custodian's stock and making all replenishment decisions. To assist the vendor, the custodian provides the vendor with up-to-date access to information about stock on hand, rate of consumption, and losses and adjustments. This is often done electronically, usually through an electronic data interchange. The vendor forecasts the custodian's needs and schedules the delivery.

VMI benefits the custodian because the vendor has real-time information about the custodian's inventory needs and consumption rates. The vendor has more time and more options to replenish stock, and inventory discrepancies can be identified earlier (Achabal et al. 2000).

In a non-VMI system, the vendor relies on orders from the custodian to signal both replenishment of inventory and how the vendor should manage his inventory to meet future needs. In many settings, this arrangement has not worked well, often resulting in repeated crises for the vendor and the supply chain. In some cases, by the time the vendor receives the custodian's orders, the custodian already has shortages. The vendor is not able to keep up with demand because of a lack of visibility into the custodian's needs and delays in data exchange between the two entities. In this unproductive cycle, custodians try to work with vendors who appear to be unresponsive—but, in reality, the vendor has not been given a chance to catch up to the custodian's needs. The custodian's orders might become more erratic, creating more confusion for both parties. In other cases, if custodians anticipate potential shortages, or the vendor makes decisions that are not to their advantage, they might deliberately send orders that do not accurately reflect their replenishment needs, creating more confusion (see figure 1).

Traditionally, the custodian controls the timing and the size of the order being placed. With VMI, the vendor, at the custodian's location, manages the timing and amount of stock to be replenished.

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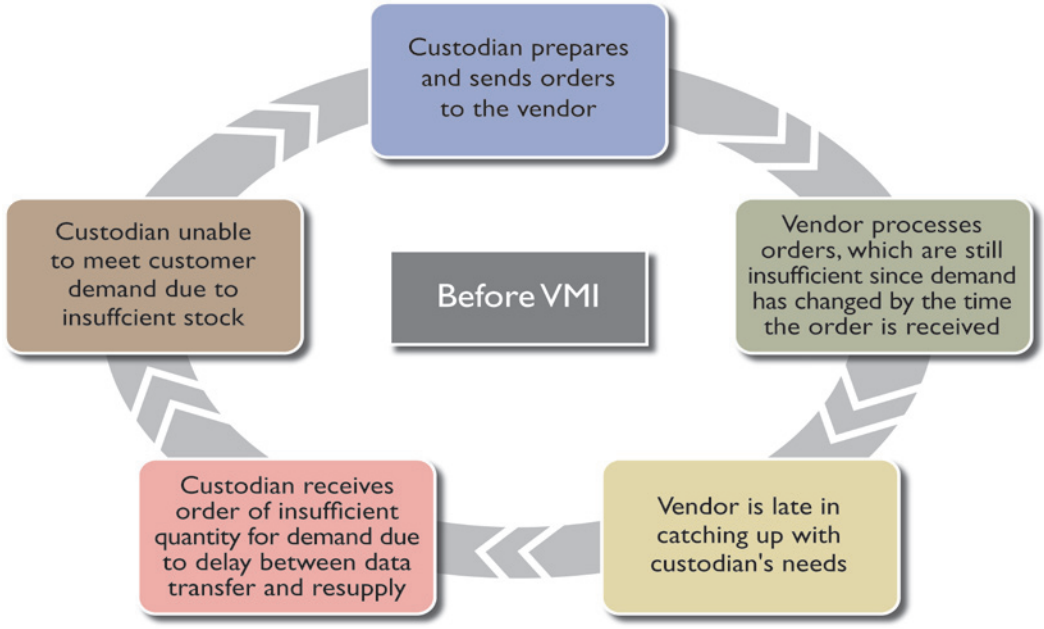
Figure 1. Potential Unproductive Cycle of Non-VMI Replenishment Systems



Because of the vendor's forecasting capability and familiarity with the market for the commodity, VMI offers many benefits for the supply chain. This capability and familiarity may result because (1) the vendor's products are only a subset—in some cases, a small subset—of the entire range of products managed by the custodian; and (2) the vendor has a broad view of the market that is different from the custodian's, who may only have information about their specific market area.

These dynamics can impart benefits to the vendor, as well as their custodians, even though it appears that the vendor is assuming more responsibility and activity in the supply chain. The improvement in commodity availability to the custodian—therefore, to the end user—implies an increased sale of the vendor's products. Using VMI, the custodians enable the vendor to better plan their operations; and the vendor will be more aware of the stock needs, which helps drive down cost. This enables the vendor to offer better service to custodians, win stronger loyalty, and increase their share of business (see figure 2).

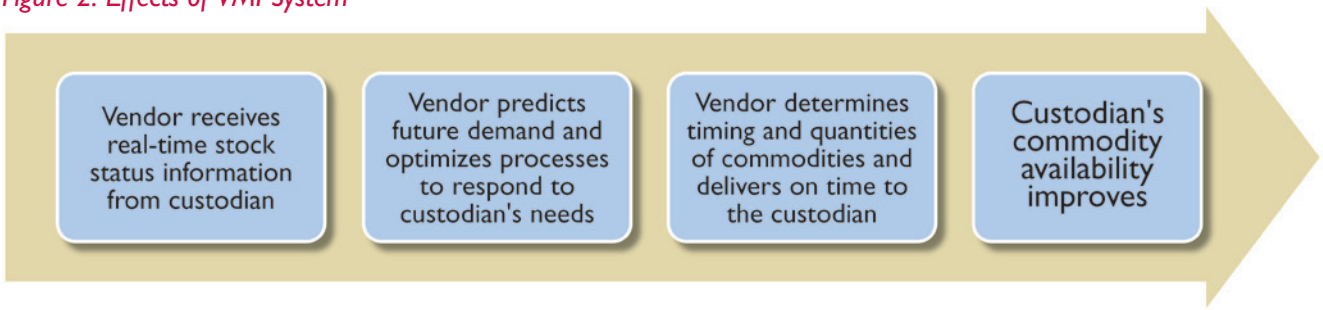
Benefits to both the vendor and custodian in a succesful VMI system include—

- a reduction in supply chain inventory levels and associated expenses, such as handling and storage costs
- an increase in commodity availability at the custodian's location, which can lead to higher profits from sales
- a reduction in transport and distribution costs
- greater interdependency and cooperation between the vendor and custodian, making the improvements sustainable, and positioning both parties for further improvement.

In the private sector, what leads to benefits from VMI?

- vendor's real-time information on inventory needs and consumption trends
- relatively superior forecasting capability and the vendor's familiarity with the commodity market.

Figure 2. Effects of VMI System



What Is VMI in the Public Health Setting?

VMI in the public health setting is an approach where an external party assumes responsibility for managing stock, and potentially also support systems and related physical infrastructure, at a public health facility (either a service delivery point or warehouse) which has custody of physical stock. Several health programs in developing countries have attempted to achieve the supply chain benefits associated with VMI in the private sector by implementing similar initiatives in their own sector.

To understand better how VMI applies to public health programs, you need to understand the relationships between the parties involved:

- The custodian is the agency that receives physical possession of the stock from the VMI partner and is responsible for the stock receipt, storage, and disbursement. Prior to VMI, the custodian would not only have custody of the commodity but would also be responsible for forecasting and procurement for replenishment. Examples of custodians include central medical stores; regional warehouses; and service delivery points, such as hospitals and clinics.
- The customer is the agency that enters into the contractual relationship with the VMI partner, either as the agency that has management oversight of the custodian facilities, or is responsible for the funding commitments for commodities. In public health settings, the customer is the country government, health department, or funder. In both case studies included in this brief, the service delivery points are the custodians, while the National AIDS Coordinating Agency (NACA) and Zimbabwe National Family Planning Council (ZNFPC), respectively, are the customers.
- VMI partner is the agency responsible for managing stock at the custodian's location. In the private sector, the partner is usually the manufacturer (true vendor); but, in the public health setting, VMI can be implemented with parties who are not the true vendor (manufacturer or their distributing agent) for the health commodity. The only requirement is for the VMI partner to be an external third party to the customer. VMI has been beneficial in public health settings even when the VMI partner was a central medical store, or implementing partner providing technical assistance. For example, in the Zimbabwe case study that follows, the VMI partner was the USAID | DELIVER PROJECT team.

VMI can improve inefficiencies in the commodity resupply process. The inefficiencies may result from the custodian's lack of infrastructure and resources; lack of stock management capability, including deficiencies in motivating custodian personnel; or both.

Credit: Jean Jacques Augustin for SCMS

This is appropriate because of the following:

- True vendors (manufacturers) of commodities for the public sector may think the public sector is an uninteresting or undesirable customer for a VMI relationship. Dysfunctional management, both operational and financial, is the usual reason for such resistance.
- Some public health products need to have multiple true vendors, particularly when commodities are generic, or because of supplier capacity or risk management, multiple vendors are contracted to provide the commodity. If multiple suppliers are required, a VMI approach is usually inappropriate because it would be difficult for any single vendor to determine the replenishment need for their particular commodity.
- Within public health, having many people with various interests in the public health supply chain expands the pool of VMI partner candidates beyond the true vendors. Also, the types of relationships between the public sector and the potential partners are more extensive because of the diversity in legal status, mandates, internal restrictions, and freedom.

The three parties interact through the following mechanisms:

- The custodian must share logistics data with the VMI partner for VMI to function correctly. At a minimum, this includes consumption over time and stock on hand, but it can also include information that enables the VMI partner to more accurately predict future consumption, such as planned changes in health services. In existing public health case studies on VMI, information sharing is typically a labor-intensive process that requires the VMI partner to physically visit the custodian site; although, in the private sector and a few public health situations, this data can be shared by phone or computer.
- A set of objectives or service-level agreements must guide VMI-partner activities to ensure that performance is monitored and evaluated. For stock availability, examples of objectives include maintenance of stock levels between agreed-to maximums and minimums. Objectives can also be implied and not clearly expressed, as the Nigeria case study shows. Because the vendors were paid based on the actual use of the laboratory equipment, vendors ensured that the laboratory equipment was always operational. To achieve these objectives, VMI partner activities will, at a minimum, include determination of stock needs and delivery of those commodities to the custodian. Additional activities can help provide improved stock management or additional services for the custodian; or help the VMI partner better manage their own operational activities, such as production planning to meet the stock needs of the customer base.

Case Study: Procurement and Delivery of Laboratory Supplies in Nigeria

In Nigeria, the National Agency for the Control of AIDS (NACA) received a grant from the Global Fund to Fight HIV/AIDS, Tuberculosis and Malaria to improve access to antiretroviral therapy, and counseling and testing services, which would include all 36 states and the Federal Capital Territory. To achieve this, NACA had to ensure that laboratory items were available for HIV and AIDS testing at the service delivery points (SDPs) in the country. NACA selected and sub-contracted with a number of local private sector suppliers of laboratory equipment, reagents, and test kits to deliver these items directly to the SDPs. Initially, the suppliers visited SDPs to assess stock status for HIV and AIDS laboratory items and to set minimum stock levels, maximum stock levels, and review periods. At the end of each review period, suppliers visited each SDP, determined the types and quantities of test kits and reagents that needed to be replenished, and then delivered the supplies. They also determined if any equipment needed servicing. The suppliers then prepared an invoice for the quantities supplied to each SDP; the invoice was sent to NACA for verification and payment.

What Are the Benefits of VMI in the Public Health Supply Chain?

VMI can improve inefficiencies in the commodity resupply process. The inefficiencies may result from the custodian's lack of infrastructure and resources; lack of stock management capability, including deficiencies in motivating custodian personnel; or both. For the public sector, the expected benefits from VMI include (1) the immediate benefits that result directly from the changes introduced by VMI, and (2) the contingent benefits that will come after additional effort (see figure 3).

Of the five models, VRI is closest to the traditional VMI in the private sector.

Credit: Jean Jacques Augustin for SCMS

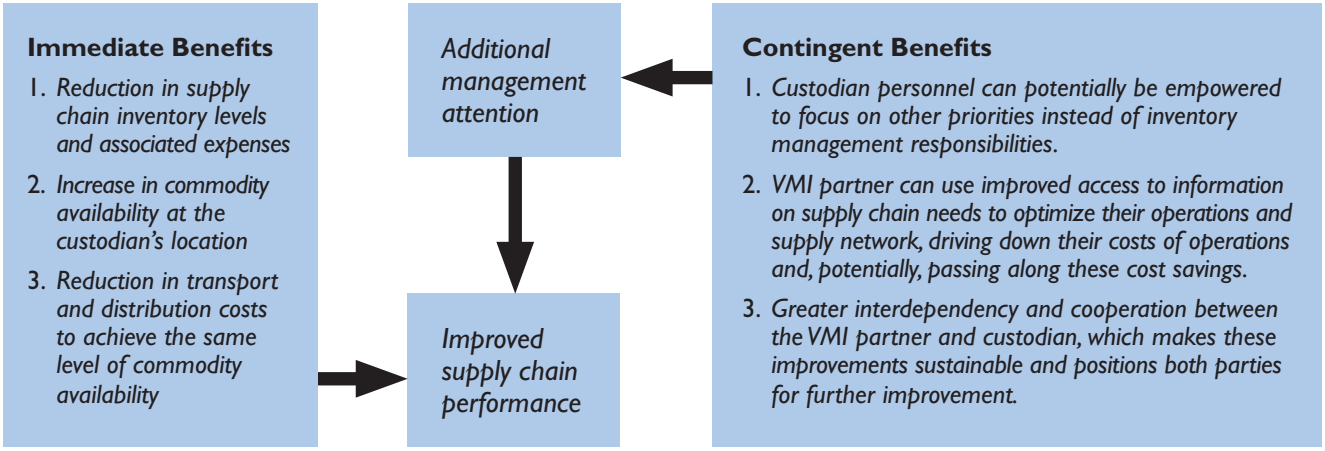
Case Study: Delivery Team Topping Up in Zimbabwe

Delivery Team Topping Up (DTTU) is a forced ordering truck-based inventory control system. Health facilities do not place orders; instead, every review period, a team of trained logisticians takes a delivery truck loaded with commodities from a central store to service delivery points (SDPs). At each SDP, the team physically counts the stock to establish levels, reconciles losses and adjustments, tops up SDPs to maximum stock levels, and recovers damaged or expired products. They calculate and record stocks to deliver on the Delivery/Receipt Voucher (DRV). In Zimbabwe, a DTTU system has been set up for several commodities (e.g., test kits, contraceptives, some antiretrovirals, etc.). From two central stores, delivery trucks go to approximately 1,600 facilities. The system has resulted in 98 percent coverage and a stockout rate of less than 5 percent.

The benefits of VMI in the private sector are similar to the public health sector in developing countries. Better visibility into the stock and consumption patterns of lower levels in the supply chain helps upstream partners understand what is happening and they can take proactive steps, instead of reactive steps, to address issues. This is particularly important in situations where lower levels engage in erratic, irregular, or deliberately misleading stock replenishments—examples include ignoring standardized resupply frequencies, forgetting to order, and placing poorly calculated orders.

Second, lower tier and last mile facilities often have fewer personnel and infrastructure than higher level partners. As a result, it is harder to develop strong stock management skills at

Figure 3. Expected Benefits of VMI System



the lower levels of the supply chain than it is at the higher levels. Shifting inventory management responsibilities to better-resourced partners should produce more accurate and complete stock replenishment, as well as provide better clinical service.

What VMI Models Can Be Applied to Public Health Supply Chains?

After examining case studies of VMI implementations in the public sector, five models of VMI have been defined:

1. Vendor Replenished Inventory (VRI)
2. Vendor Managed Inventory Services (VMIS)
3. Third Party Replenished Inventory (3RI)
4. Third Party Managed Inventory Services (3MIS)
5. Inventory Management Technical Assistance (IMTA).

These models capture the variations between VMI implementations, including the type of VMI partner that has inventory management responsibility (true vendor or third party), the type of responsibility assumed by that partner (inventory management or inventory management with equipment maintenance), and whether the VMI implementation is a type of temporary technical assistance to the custodian (see figure 4).

Vendor Replenished Inventory

With Vendor Replenished Inventory (VRI), the health commodities vendor is only responsible for managing inventory replenishment decisions for the custodian of the health commodities. Of the five models, VRI is closest to the traditional VMI in the private sector.

Vendor Managed Inventory Services

With Vendor Managed Inventory Services (VMIS), the vendor of health commodities is responsible for managing inventory, as well as inventory-related support systems and infrastructure—for example, equipment required for providing health services. One example of a VMIS model is the laboratory supplies example from Nigeria; the vendor offered the additional service of maintaining laboratory equipment.

Third Party Replenished Inventory

With Third Party Replenished Inventory (3RI), another autonomous third party, not the vendor of health commodities, is responsible for managing the replenishment decisions for the custodian of the health commodities; for example, a government parastatal or implementing partner. A good example is the DTTU example described earlier for Zimbabwe.

Third Party Managed Inventory Services

With Third Party Managed Inventory Services (3MIS), instead of the vendor of health commodities, another autonomous third party is responsible for managing stock, stock-related support systems, and infrastructure.

Figure 4. Vendor Managed Inventory Models

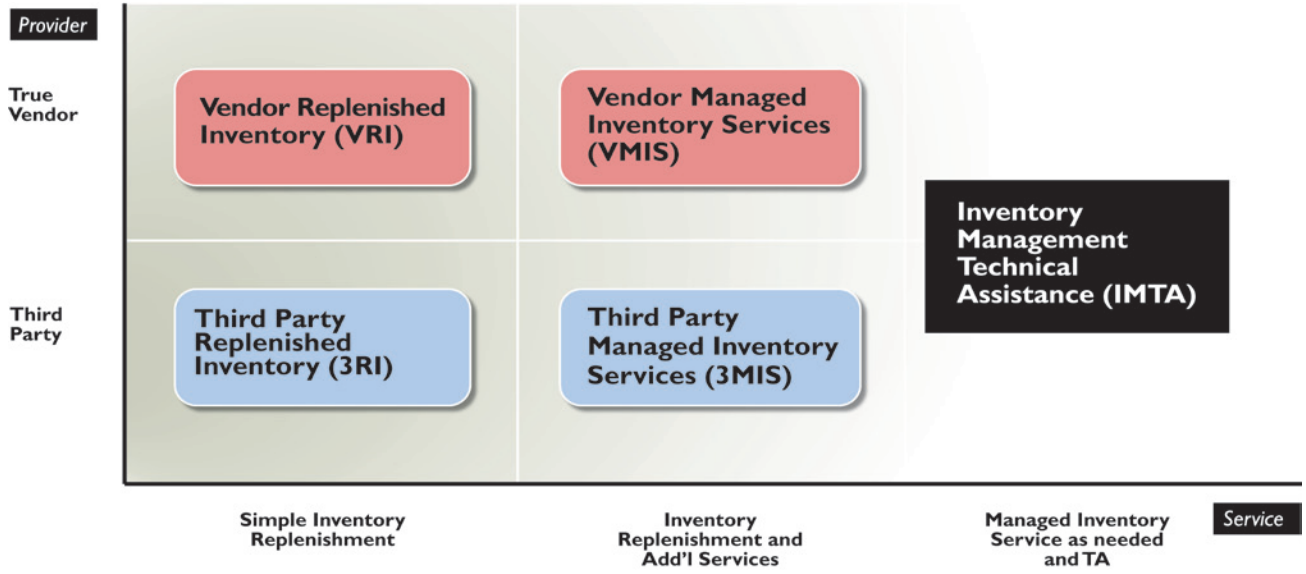
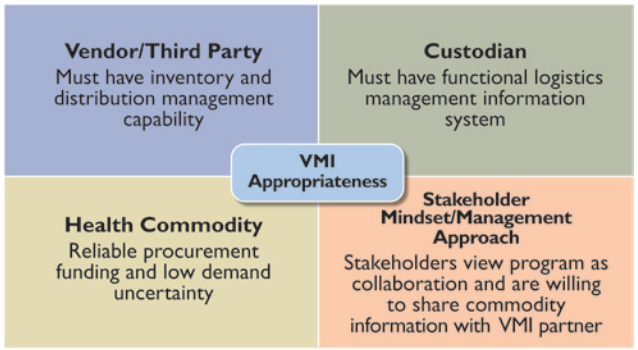


Figure 5. VMI Appropriateness for Public Health Supply Chains



Inventory Management Technical Assistance

With Inventory Management Technical Assistance (IMTA), the VMI partner (who could be the vendor of the health commodities or another external third party) is responsible for managing the custodian's stock, which can include managing support systems and related infrastructure. But, primarily, the partner provides technical assistance so that the custodian can directly perform these management duties. Under IMTA, the autonomous third party is ultimately accountable for mismanaged stock or miscalculated resupply quantities, even if the custodian has assumed regular stock management duties.

Is VMI Right for Your Supply Chain?

Implementing a VMI model is a significant undertaking. For VMI to be appropriate for a public health supply chain, specific factors related to several areas of the public health supply chain context must be in place:

- *VMI partner:* The partner taking inventory management responsibility must have demonstrated capacity in this area.
- *Custodian:* The custodian must have a basic inventory control and information system in place that will support the establishment of service levels for the VMI partner.
- *Health commodity:* For each specific commodity, the supply chain must have a reliable source of funding and relatively predictable demand.
- *Stakeholder mindset/management approach:* All stakeholders must support the concept of data sharing between custodians and external VMI partners, and they must be committed to providing implementation support and continuous improvement.

If these factors are not present, it would inhibit the implementation process for a VMI model and would prevent the expected supply chain benefits. Figure 5 summarizes the factors that support the appropriateness of VMI in the public health supply chain.

Selecting and implementing vendor managed inventory systems for public health supply chains:

If you would like to consider VMI for your supply chain, *Selecting and Implementing Vendor Managed Inventory Systems for Public Health Supply Chains: A Guide for Public Sector Managers*, offers additional information to assist in planning. This document, available at www.deliver.jsi.com, provides—

- a detailed VMI appropriateness survey, including a complete set of appropriateness factors
- guidance on how to select the most appropriate VMI model
- additional developing country public health VMI case studies
- considerations for implementing a VMI model in a public health setting.

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